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ABSTRACT

The process being used by the University of Montevallo (Alabama) to evaluate the outcomes of its general education program is presented. Emphasis is on the triangulation procedure used to evaluate the validity of the outcome measure selected--the College Outcomes Measures Project (COMP) Test of the American College Testing Program (1984). The University had implemented a common core curriculum in 1985 that included a set of goals for the general education program. The evaluation method required the faculty to determine the relationships between the core goals and the knowledge measured by the COMP Test, between the goals and core courses, and between the knowledge measured by the COMP Test and core courses. The triangulation of these three components provided insight into the validity of the COMP for evaluation. As longitudinal data on student progress toward the goals accumulate and relatively weak areas are established, the developed matrix can be used to identify how courses address goals. Validity is demonstrated when the test, goals, and core courses overlap; a lack of overlap of any two components will suggest problems. The process has proved non-threatening to faculty and has stimulated discussion about ways of assessing outcomes. One figure is included. Four appendices provide the goals, the evaluation model, a table of relationships between core goals and the curriculum, and a sample curriculum validation worksheet, respectively. (SLD)

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A TRIANGULATION APPROACH TO THE VALIDATION OF THE COMP FOR OUTCOMES EVALUATION

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October, 1989

We thank the University of Montevallo General Education Committee and other faculty members who assisted in the local validation study of the COMP test. We also thank the Evaluation and Assessment Laboratory staff for their assistance in developing the evaluation model and conducting the faculty survey used to relate course content to general education and COMP goals.

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A Triangulation Approach to the

Validation of the COMP for Outcomes Evaluation

Evaluators have long cautioned against program evaluations that examine only processes. Until recently, most accrediting bodies used models that were dominated by input and process evaluation. As local accrediting bodies and then a state education agency (Mississippi) adopted outcomes oriented accreditation, the regional accrediting bodies began to pay attention. The first of these to formally adopt an outcomes or institutional effectiveness standard was the Southern Association of Colleges and Schools (SACS, 1987).

This movement is positive from an evaluator standpoint in that evaluators are now involved at a wide range of levels in the accreditation process. The outcomes accreditation standards have spawned a new industry of outcomes oriented measurement instruments and personnel positions for or even offices for outcomes evaluation. Along with this new movement have come the associated problems. Not the least of these problems is the selection and validation of instruments to measure the outcomes of our educational processes.

The purpose of this paper is to present a case study of one institution's struggle to evaluate the outcomes of its general education program. The emphasis is on the triangulation procedure used to evaluate the validity of the outcome measure selected for the study. It is hoped that shared experiences such as this will lead to improved outcomes assessment nationwide.

Background

There has been a resurgence of interest in general education/liberal education in recent years (Boyer & Levine, 1981; Gaff, 1983, NIE Study Group on the Conditions of Excellence in American Higher Education, 1984). This has been coupled with a movement in the last few years toward the evaluation of outcomes of postsecondary education (Bennet, undated; Boyer, Ewell,

Finney & Mingle, 1987; Ewell, 1987; Hartle, 1985; NIE Study Group on the Conditions of Excellence in American Higher Education, 1984), as evidenced by the states and accrediting agencies now requiring outcomes assessment (Boyer et al., 1987) and by four national conferences (held in Columbia, SC, October, 1985; Denver, CO, June, 1987; Chicago, IL, 1988; and Atlanta, GA, 1989) on assessing outcomes of higher education. The American Evaluation Association now has a TIG on Assessment in Higher Education that is sponsoring this session. The last three have been sponsored by American Association of Higher Education. Leaders in the outcomes assessment movement have stressed the importance of developing evaluations that are specific to a given educational institution/program and its own goals (Bennet, undated; Edgerton, Callan, & Read, 1987; Ewell, 1984, 1987; Hartle, 1985; Smith, 1987; Stewart, 1987). Until recently, however, standardized measurement instruments to assess student attainment of the goals of general education did not exist. The College Outcome Measures Project (COMP) Test, developed by the American College Testing Program (1984) in the early 1980s, was the first nationally standardized instrument designed for this purpose (Forrest & Steele, 1982). The Educational Testing Service (ETS) has developed The Academic Profile and its successor, The Academic Profile II (AP II), another instrument designed to assess general education outcomes (Altman, 1987). American College Testing Program has developed the Collegiate Assessment of Academic Proficiency (CAAP).

Program evaluations are often undertaken by faculty or administrative personnel who have little experience in selecting and using assessment instruments and therefore are often uncertain about how to evaluate a particular instrument to determine its appropriateness for measuring specific institutional goals. Many schools have instituted general education programs and have begun to evaluate them, using the COMP or APII or considering their use, often doing so without

relating the test directly to their own educational goals, and without having any clear way of knowing which of their goals are, or are not, being assessed by these tests.

A seemingly straight-forward question such as the validity of COMP has many hidden problems when the test is used for outcomes evaluation. Some of these problems currently have no solutions. For example, since education is cumulative, there is no way to attribute specific gains in knowledge to a specific instructional period of time even in experimentally designed studies. Further, the outcomes of educational instruction may not manifest themselves until years after the instruction, particularly if the outcomes are due to interactions between the instruction and other events.

An outcomes evaluation for an institution has another major weakness common to many outcome-oriented evaluation studies. That weakness is the lack of a reasonable comparison group. Obviously, randomization is not possible. But obtaining any comparable group that did not receive the instruction would be almost impossible. This problem bears many similarities to the problems encountered in trying to evaluate many compensatory education programs in the 1960s and 1970s. Thus, an institutional outcomes assessment must be limited to a no comparison group approach or use itself as a comparison (time-series).

Method and Example

This paper provides a description of an experience with outcomes evaluation at the University of Montevallo (UM). The UM is a small state-supported institution with a strong liberal education mission and a regionally recruited student body. The UM implemented a common core curriculum in 1985 following eight years of goal definition and program development by the faculty (University of Montevallo, 1978, 1983). This curriculum included a set of goals for the general education program as defined by the core curriculum (see Appendix A) and is now

referred to as general education.

Evaluation was from the start a component of the overall plan, not a result of any external pressures. The evaluation process was designed for program improvement--to identify which stated goals were and were not being met and to provide direction for designing ways to enhance the areas where goals were not being met adequately.

An evaluation subcommittee was named from the UM General Education Committee to design and carry out an evaluation of the general education program. Initial efforts of the evaluation subcommittee in 1983-84 were directed toward identification of a measure of general education outcomes suitable for evaluating the university's general education program. Criteria for an instrument included (a) objectives consistent with the UM program, (b) standardized format with research-based validity and reliability studies, (c) participating institutions similar to UM, and (d) available national norms. The instrument also needed to be currently available since the seniors of 1984 were the last students who were products entirely of the previous general education (distribution requirements) program and their outcomes were needed to establish baseline data (Ernest & Rodgers, 1986). The evaluation subcommittee selected the COMP exam to assess UM's general education outcomes because, at the time, it was essentially the only nationally standardized instrument available, and because it appeared to address many of the university's general education goals.

The evaluation committee realized that COMP, even if it proved to be valid, was only one aspect of the overall evaluation. Thus, in consultation with personnel from the Evaluation and Assessment Laboratory, at The University of Alabama, they developed an overall model of their general education programs that included the major components of an evaluation (see Appendix B).

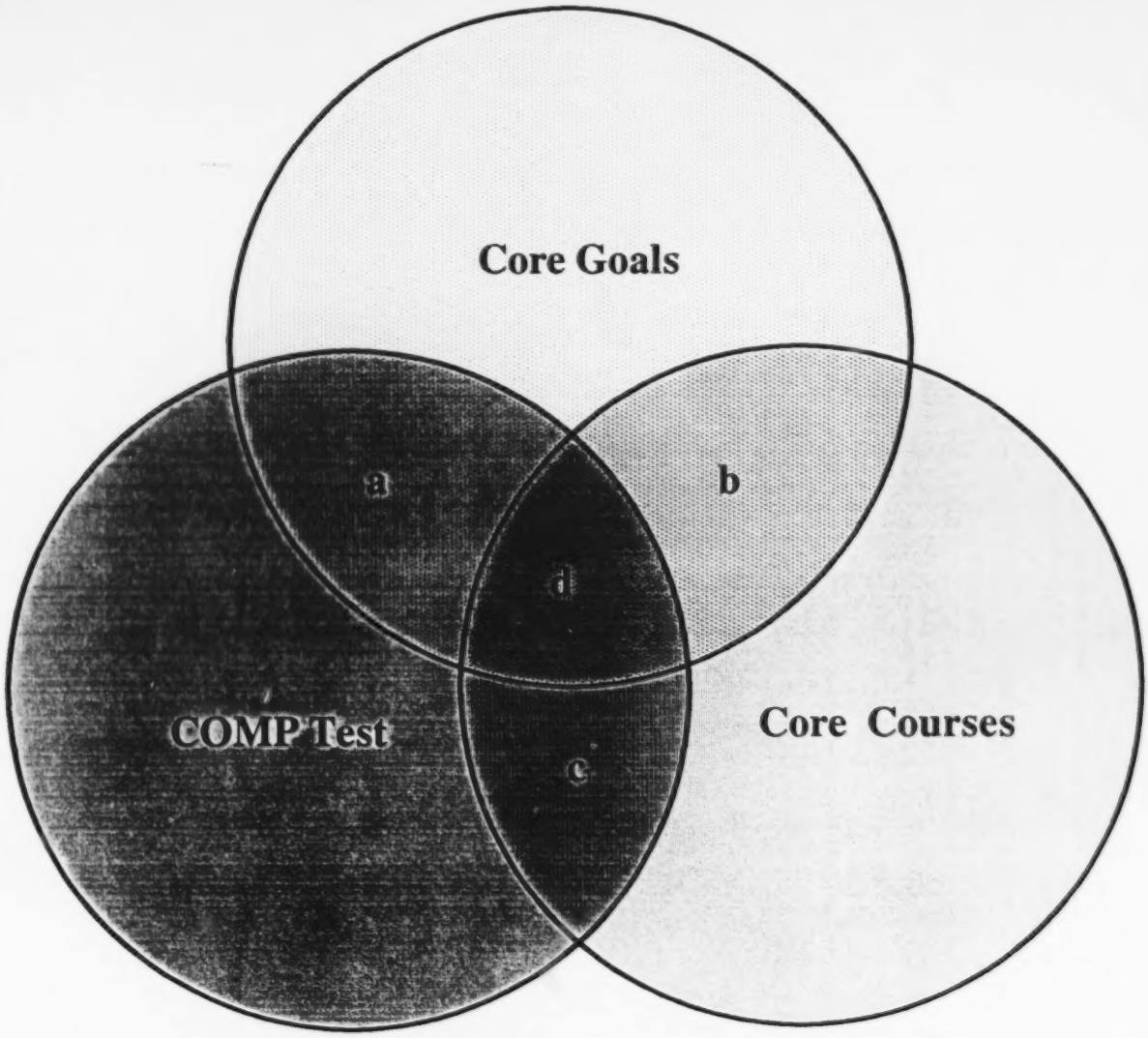
Obviously, COMP may not measure all of the goals of the general education program and the first step was a study of the validity of COMP for this purpose. It was recognized that in order to demonstrate that COMP was valid, three components of the evaluation must converge--the knowledge being measured by COMP, the goals of the general education program, and the content of the general education courses (see Figure 1). In terms of recent measurement vocabulary, we wanted to assess the curricular and instructional validity of the COMP for the outcomes evaluation of the UM general education component.

The first step was the comparison of the general education goals with the COMP goals. Appendix C presents a matrix that shows the relationship between the general education goals and the COMP goals with the COMP questions that supposedly measure each COMP goal. The matrix in Appendix C was used as the basis of the evaluation. It assisted the evaluators in accomplishing the following tasks:

1. **Identify general education goals that have no corresponding COMP goal.** This was done by identifying obvious omissions in the COMP columns of the matrix. An omission reveals where no COMP goal corresponds to one of the institution's general education goals, indicating that other measures need to be found or developed to assess this goal. This review, done by the evaluation subcommittee, identified several goals that were not being assessed by COMP, including such things as understanding the history of ideas, application of health information to personal lives, and habits of critical inquiry that lead to lifelong learning.

2. **Identify COMP score areas that can be ignored in assessing the local general education outcomes.** This can be done by identifying objectives COMP was designed to measure, but that are not goals of the institution's GE program. At UM, this was also done by the evaluation subcommittee, and revealed that all COMP goals were at least indirectly related to the general education goals.

3. **Identify general education goals that may be subtly different from apparently equivalent COMP goals.** This can be done by a close review of overlap areas, where COMP seems to directly address institutional goals, but where subtle differences may exist that need closer scrutiny. The evaluation subcommittee reviewed goal statements carefully to identify such subtle differences, including cases where most but not all of the components of a general education goal were covered by a COMP goal. Through discussion, differences were determined to be trivial or substantial. Differences deemed trivial could be ignored, and the general education and COMP goals could be



a COMP Test measures material identified by Core Goals (but not taught in Core Courses).

b Core Courses teach material identified by Core Goals (but material is not tested by the COMP Test).

c COMP Test measures material taught in Core Courses (but not related to Core Goals).

d Validity is achieved at the triangulation of the COMP Test, Core Goals, and Core Courses, i.e. material covered by the COMP Test and required by the Core Goals is taught in the Core Courses.

Figure 1. Relationship of Validity to the Core Goals, Core Courses, and COMP Test.

3. continued

considered essentially the same. Differences deemed substantial, however, indicated additional areas where other means of assessing general education goals needed to be sought. In cases where the goal statements themselves did not provide enough information, questions were left to be considered in the next step.

4. **Enlist the aid of the faculty in examining the curricular validity, and to some extent content and construct validity, of the COMP test as a measure of institutional goals.** Faculty members who taught general education courses were asked to go through the COMP test in detail to determine the relationship of the COMP items to the institution's general education goals. This relationship was determined through the process of (a) identifying items that do not seem to test the related institutional goal, and (b) considering each cluster of items to determine if the items taken together address the intended goal fairly well or if they do not adequately address the goal. If the item clusters were seen as adequate for the goal, then COMP was assumed to measure this particular outcome of general education. If they were not seen as adequate, then there is still need for another measure of this goal.

Sixteen UM faculty members, all involved in teaching general education courses, were selected to examine COMP, section by section and item by item, as described in the four above steps, to ascertain the local curricular validity of the test. These faculty were provided with a set of worksheets, each with one of the UM General Education Goals at the top, followed by the apparently relevant COMP goals and the item numbers of each COMP item purportedly assessing that particular goal. A sample worksheet is in Appendix D. Faculty were given copies of the COMP test and were presented the auxiliary audio-visual materials accompanying the test. Approximately one-third of these faculty had earlier "taken" the COMP test during regular student administrations. During this special faculty administration, however, as each section was administered, the faculty responded to the questions and then discussed that section before participants went on to the next section. For some sections of the test where stimulus materials are in the test booklet, only part of the faculty group (those most familiar with the particular content area being tested) examined the test content.

Following administration of COMP, faculty were asked to respond to three questions. First, in their perception, were there any general education goals for which there were no corresponding COMP goals. Although this question had been addressed previously by the General Education Committee and the evaluation subcommittee (see matrix development above), it was felt that this was a good way to introduce the faculty to the test itself and to refresh in their minds the goals of the General Education program. Second, were there any general education goals that appeared subtly different than the apparently equivalent COMP goals. Third, were there any test questions which they felt to be misleading, incorrectly keyed, or not really testing the general education and/or COMP goal which they were supposed to address.

The instructional validity was addressed by surveying the faculty who teach the general education curriculum courses (Rogers & McLean, 1986; Rogers, Bolland, Moon, & McLean, 1986).

Responses to questionnaire items were tabulated in several ways to provide multi-level interpretation of the results. First the items were grouped by goals, and tables prepared to show total faculty response to each item related to a goal (Complete tables are available on request). The results indicate that every one of the General Education goals is indeed being addressed in many courses. Because of the diversity of courses and the disproportionate representation of physical education courses, some of the goals do not at first appear to be emphasized in as high a percentage of courses as might be expected. The tabulated results must therefore be interpreted with caution. A less ambiguous picture of the results may be seen in the more detailed breakdowns.

Next, courses were grouped into general education core areas and items organized within areas by Goals. The Evaluation Subcommittee and the General Education Committee looked at these tables closely, for they provided the most complete information on Goal emphasis by area

of instruction.

Finally, when one of several courses was selected to meet a general education core area requirement (i.e., distribution requirements), they were tabulated to show the extent to which each individual course covered each Goal. Once again, small frequencies indicate the need for care in interpretation. These tables, along with the ones in the previous group where only a particular course could be selected to meet a requirement, provided the most detailed level of analysis. These indicated to the General Education Committee the degree to which individual courses approved to satisfy General Education requirements are in fact addressing related goals, at least so far as the instructors of these courses report. Later studies should address these same questions to students to see the extent they view the goals as being emphasized in the courses. A complete description of the results can be found in Rogers, Bolland, and Ernest (1989).

Discussion

The process of establishing the relationship of the institution's General Education goals and COMP objectives provided data to determine which goals were and were not being assessed. An analysis of the unmeasured goals yielded areas where alternative measures were needed. For some goals where COMP does not adequately assess the goal, other published and/or nonpublished instruments may be tried, e.g., Eison's Learning-Oriented/Grade-Orientated scale for changes in attitudes for lifelong learning (Eison, 1981, 1982; Eison, Polio, & Milton, 1982; Rogers & Palmer, 1987; Rogers, Palmer, & Bolen, 1988). For other goals, there may be no national test available, thus local tests, questionnaires, and/or other measures and strategies (e.g., collection of qualitative data, review/analysis of existing records, examination of unobtrusive measures, etc.) may need to be developed to assess progress toward those goals.

As longitudinal data on student progress toward General Education goals accumulates and relatively weak areas are identified, the matrix can be used to identify how many and which courses are addressing those goals. Steps can then be taken to strengthen this component by modification of existing courses or by addition of other courses.

This process can be used by other postsecondary institutions for relating their general education outcomes to available measurement instruments. By expanding the columns of the matrix, multiple tests could be compared for their relative congruency with an institution's goals. UM is planning to repeat this process with the Academic Profile. As supplementary measures are adopted, columns can be added until all goals are being assessed. The key is still the triangulation or overlapping of the general education core goals, the general education core courses, and the instrument used to measure the goals.

Thus, when triangulation is achieved, the test, goals, and core courses are overlapping and we have achieved "validity." However, a lack of overlap of any two of the components suggests problems. For example, if the goals and the test overlap (i.e., area "A" in Figure 1), we may need to examine further the courses or examine if, indeed, the goals are appropriate.

It should be noted that faculty involvement in this process has the added advantage of serving faculty development by stimulating discussion about innovative ways of assessing often difficult-to-measure outcomes that can also be used as models for assessment of student learning in the classroom. Further, the process proved to be non-threatening to faculty and served as a way to clarify and assess their goals.

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APPENDIX A

Statement of Purposes and Goals of the Core
Educational Program University of Montevallo

The core educational program of the University of Montevallo introduces students to a broad spectrum of knowledge and experiences designed to develop the mind, the emotions, the spirit, and the body. The purposes of the program are to enable students to participate as responsible, informed citizens in a democratic society and in the global community; to become self-educating individuals; to work creatively and effectively; and to lead satisfying personal lives.

To accomplish these purposes, the core educational program enables students to attain the following goals:

1. To develop skills in the use and interpretation of symbol systems which employ words, numbers, and visual/aural imagery; specifically,

    a. to develop the ability to use and interpret language in written and spoken forms
    b. to develop the ability to use and interpret mathematical structures
    c. to develop the ability to interpret other visual and auditory symbol systems.

2. To develop the ability to use rational processes in consideration of ideas and problems, including the ability to make judgments based upon description, analysis, and interpretation.

3. To search for and develop personal, family, and community values through a study of the past, its vitality in the present, and its relevance to the future; specifically, by enabling students

    a. to analyze human developments and behavior
    b. to understand the history of ideas
    c. to learn about political, social (family and community), economic, philosophical, and religious systems by which humanity has organized itself.

4. To develop the ability to explore and appreciate the imaginative presentation of human experience through literary, visual, performing, and other arts.

5. To become knowledgeable about the physical and biological structure of nature, the place of humanity in the natural world, and the ethical, economic, and political dimensions of humanity's impact on the environment.

6. To apply knowledge about health, nutrition, physical activity, and aesthetics to their personal lives and environments and to their communities.

7. To develop the ability to engage in effective interpersonal relationships, to understand their responsibilities in the American democratic community and in the world-wide human community, and to understand leadership roles.

8. To develop inner resources such as imagination, a sense of wonder, self-discipline, and a habit of critical inquiry so that they may engage in lifelong, self-directed learning.

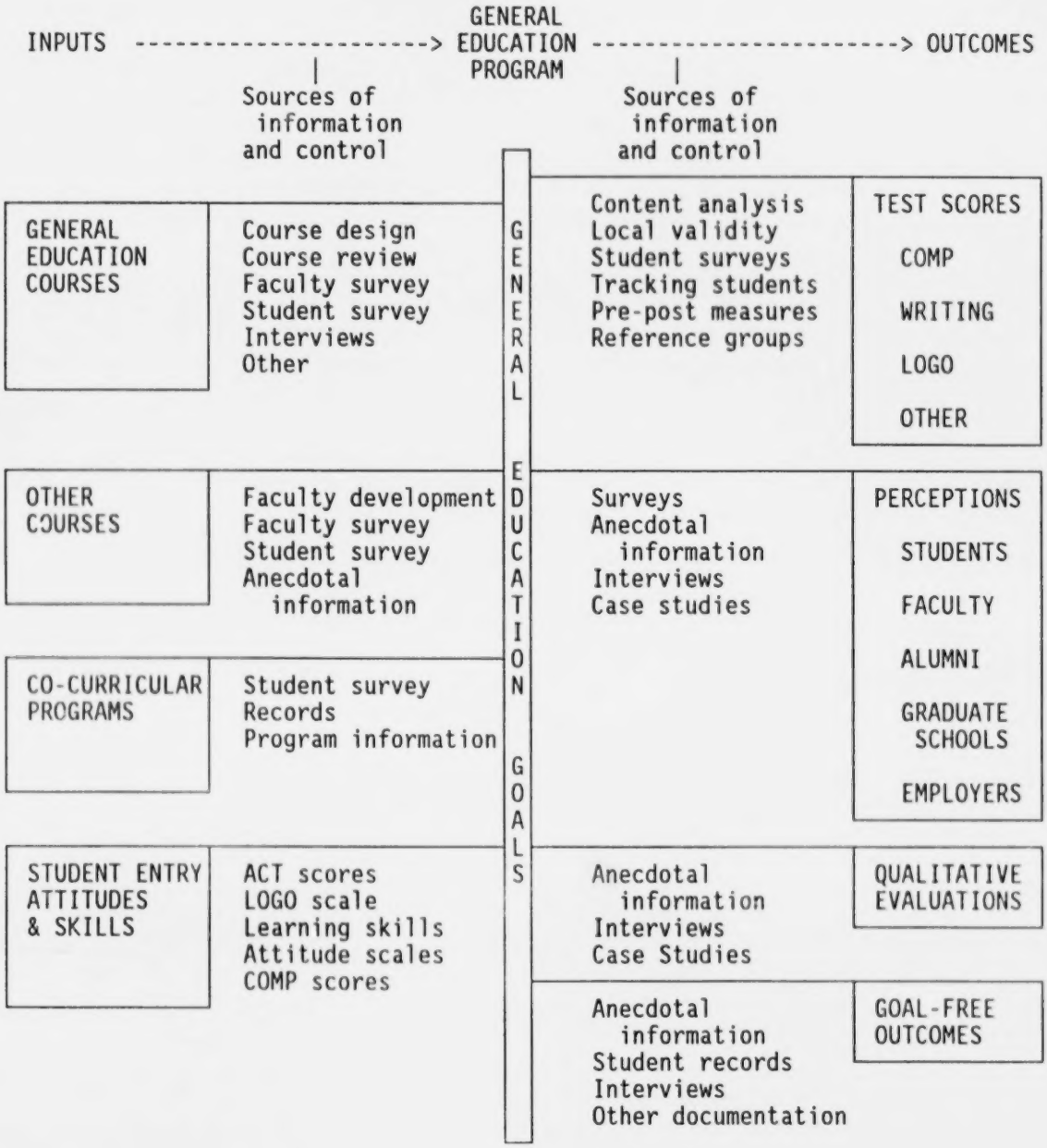
9. To affirm the value of work and leisure, to become aware of the wide range of career and leisure opportunities through which they may make contributions to society and achieve personal satisfaction, and to develop the self-knowledge, the competencies, and the qualities of mind (see Goals 1-8 above) which contribute to successful employment and fruitful living.

10. To become knowledgeable about the prospects for change occurring in their lifetimes and in subsequent generations so that they may be able to adapt to new conditions and to demonstrate responsible, creative leadership in shaping a changing world.

University of Montevallo Core Curriculum Committee. (1983). A proposal to University of Montevallo faculty of a revised core educational program. Montevallo, AL: Author.

APPENDIX B

THE MONTEVALLO MODEL



APPENDIX C

THE RELATIONSHIP BETWEEN THE CORE CURRICULUM AND COMP GOALS
(With Questionnaire Items)

COMP MATRIX

Core Goals	COMP Goals	COMP Questions	Faculty Survey Questions
1. To develop skills in the use and interpretation of symbol systems which employ words, numbers, and visual/aural imagery; specifically:			
1.a to develop the ability to use and interpret language in written and spoken forms	A. Can receive information from oral presentation, media presentations, and nonverbal cues.	1-2, 7-8, 13-14	1. To be able to understand, analyze, and/or interpret written or spoken language
	B. Can send information via speech, media, and nonverbal presentations.	103-104, 109-110, 115-116	4. To be able to transmit verbal (oral and/or written) information
	C. Can receive information from written materials.	55-56, 63-64, 71-72,	
	D. Can send information using written materials	79-80, 87-88, 95-96	
1.b. to develop the ability to use and interpret mathematical structures	E. Can receive information from numeric and graphic representations.	19-20, 31-32, 43-44	2. To be able to understand, analyze, and/or interpret mathematical structures (in numeric and/or graphic form)
	F. Can send information using numeric and graphic representations.	21-22, 33-34, 45-46	5. To be able to transmit numeric and/or graphic information
1.c. to develop the ability to interpret other visual and auditory symbol systems	A. Can receive information from oral presentation, media presentations, and nonverbal sues.	1-2, 7-8, 13-14,	3. To be able to understand, analyze and/or interpret nonmathematical, visual, or auditory symbol systems
	B. Can send information via speech, media, and nonverbal presentations.	103-104, 109-110, 115-116	6. To be able to transmit nonverbal information

Appendix C Continued

Core Goals	Comp Goals	Comp Questions	Faculty Survey Questions
2. To develop the ability to use rational processes in consideration of ideas and problems, including the ability to make judgments based upon description, analysis, and interpretation.	G. Can identify and define problems (objectives and constraining factors).	3-4, 9-10, 15-16	7. To be able to analyze problems (identify, define, select approaches)
	H. Can select approaches to solve problems.	107-108, 113-114, 119-120	8. To be able to select or create solutions to problems (e.g., generate hypotheses, collect information, analyze information, evaluate probable effects of solutions)
	I. Can generate possible solutions, hypotheses, or testable propositions.	57-58, 65-66, 73-74 59-60, 67-68, 75-76	9. To be able to evaluate problem-solving processes
	J. Can collect various forms of information ("data") regarding proposed solutions with respect to a problem and its constraints.	85-86, 91-92, 99-100	10. To develop the ability to make rational judgments based on description, analysis, and interpretation of ideas and
	K. Can determine the logical consistency among the information obtained, the problem as defined, and the hypotheses or solutions proposed.	83-84, 93-94, 101-102	
	L. Can determine the solution to be implemented.	23-24, 35-36, 47-48	
	M. Can propose or select procedures to evaluate ("confirm" the appropriateness of) the solution chosen for implementation	25-26, 37-38, 49-50 105-106, 111-112, 117-118	
	N. Can evaluate the process by which a problem was "solved."	61-62, 69-70, 77-78	
	P. Can assess a set of values for internal consistency.	81-82, 89-90, 97-98	
	Q. Can identify the major influence in the development of values in individuals.	27-28, 39-40, 51-52 29-30, 41-42, 53-54	
	R. Can analyze rationales for value choices.		
	S. Can infer personal values from behavior.		
	T. Can analyze the implications of decisions made on the basis of values.		

Appendix C Continued

Core Goals	Comp Goals	Comp Questions	Faculty Survey Questions
3. To search for and develop personal, family, and community values through a study of the past, its vitality in the present, and its relevance to the future; specifically, by enabling students			
3.a. to analyze human development and behavior	Q. Can identify the major influence in the development of values in individuals.	61-62, 69-70, 77-78	19. To analyze human development and behavior
	S. Can infer personal values from behavior.	27-28, 39-40, 51-52 29-30, 41-42, 53-54	
	T. Can analyze the implications of decisions made on the basis of values.	55-56, 57-58, 59-60, 61-62	
	3. Can explain the reciprocal relationship between social institutions and individuals.		
3.b. to understand the history of ideas			31. To understand the history of ideas
3.c. to learn about political, social (family and community), economic, philosophical, and religious systems by which humanity has organized itself.	O. Can identify the major values, and issues usually faced, in daily adult life in one's own and other cultures.	5-6, 11-12, 17-18	15. To develop personal values through studying the past in relationship to the present and future
	1. Can identify those activities and institutions which constitute the social aspects of a culture.	1-2, 3-4, 5-6	16. To develop family values through studying the past in relationship to the present and future
	2. Can describe the structure and functions that underlie social institutions.	103-104, 107-108, 105-106	17. To develop community values through studying the past in relationship to the present and future
	3. Can explain the reciprocal relationship between social institutions and individuals.	55-56, 57-58, 59-60, 61-62	23. To understand one or more of the systems (political, social, economic, philosophical, religious) by which humanity is organized
	5. Can explain the implicit restraints and freedoms with in the social institutions, and can protect how degree of involvement places one in a conflicting or compatible state.	19-20, 21-22, 23-24, 25-26, 27-28, 29-30	24. To describe the structures and functions that underlie social institutions

Appendix C Continued

Core Goals	Comp Goals	Comp Questions	Faculty Survey Questions
			25. To explain the reciprocal relationship between social institutions and individuals 26. To identify the activities and institutions that constitute the social aspects of a culture 27. To explain the restraint and freedoms within social institutions 28. To predict how degree of involvement in social institutions places one in a conflicting or compatible state 30. To explain the principles of the development and change of social institutions
4. To develop the ability to explore and appreciate the imaginative presentation of human experience through literary, visual, performing, and other arts	11. Can identify those activities and products which constitute the artistic/humanistic aspects of a culture 12. Can describe the elements (e.g., sensory, compositional, expressive, and substantive) that constitute artistic/humanistic activities and products. 13. Can explain the impact of artistic/humanistic expressions on individuals. 14. Can explain the development of aesthetic awareness and theory from a number of perspectives. 15. Given the characteristics of a culture, can judge which of several artistic/humanistic expressions would be most congruent with those characteristics.	13-14, 15-16, 17-18 115-116, 119-120, 117-118 71-72, 73-74, 75-76, 77-78 95-96, 99-100, 101-102, 97-98 43-44, 45-46, 47-48, 49-50, 51-52, 53-54	34. To explore and appreciate the imaginative presentation of human experience through the arts (visual, literary, performing, and other) 35. To identify the activities and products that constitute the artistic/humanistic aspects of a culture 36. To describe the elements that constitute artistic/humanistic aspects of a culture 37. To explain the impact of artistic/humanistic expressions on individuals. 38. To explain, from a number of perspectives, the development of aesthetic awareness and theory 39. To be able to judge which of several artistic/humanistic expressions would be most congruent with given characteristics of a culture

Appendix C Continued

Core Goals	Comp Goals	Comp Questions	Faculty Survey Questions
5. To become knowledgeable about the physical and biological structure of nature, the place of humanity in the natural world, and the ethical, economic, and political dimensions of humanity's impact on the environment.	6. Can identify those activities and products which constitute the scientific/technological aspects of a culture.	7-8, 9-10, 11-12	40. To become knowledgeable about the physical and biological structure of nature 41. To understand the place of humanity in the natural world
	7. Can describe scientific concepts, laws or principles that underlie scientific/technological activities and products.	109-110, 113-114, 111-112	42. To become knowledgeable about the ethical, economic, and political dimensions of humanity's impact on the environment
	8. Can explain the impact of technology on the natural (physical and biological) environment in which it occurs.	63-64, 65-66, 67-68, 69-70	43. To identify the activities and products that constitute the scientific/technological aspects of a culture
	9. Can explain the impact of technology on the institutional and his/her culture.	87-88, 91-92, 93-94, 89-90	44. To describe scientific concepts, laws, or principles
	10. Can predict the consequences of the introduction of technology into a culture, including considerations of the scientific principles involved and of the environmental and cultural impacts of technique.	31-32, 33-34, 35-36, 37-38, 39-40, 41-42	45. To explain technology's impact on physiological and biological environments 46. To explain technology's impact on the individual and his/her culture
	T. Can analyze the implications of decisions made on the basis of values.	29-30, 41-42, 53-54	47. To predict the environmental and cultural consequences of introducing technology into a culture
6. To apply knowledge about health, nutrition, physical activity, and aesthetics to their personal lives and environments and to their communities.			48. To apply knowledge about health, nutrition, physical activity, and/or aesthetics to their lives and environments
7. To develop the ability to engage in effective interpersonal relationships, to understand their responsibilities in the American democratic community and in the world-wide human community, and to understand leadership roles.			29. To understand one's responsibilities in the American world-wide communities 32. To understand leadership roles

Appendix C Continued

Core Goals	Comp Goals	Comp Questions	Faculty Survey Questions
8. To develop inner resources such as imagination, a sense of wonder, self-discipline, and a habit of critical inquiry so that they may engage in lifelong, self-directed learning.			11. To develop the inner resources (e.g., imagination, self-discipline, habit of critical inquiry) necessary for life-long, self-directed learning
9. To affirm the value of work and leisure, to become aware of the wide range of career and leisure opportunities through which they may make contributions to society and achieve personal satisfaction, and to develop the self-knowledge, the competencies, and the qualities of mind (see Goals 1-8 above) which contribute to successful employment and fruitful living.			21. To affirm the value of work and leisure 22. To become aware of the wide range of career and leisure opportunities through which one may make contributions to society and achieve personal satisfaction
10. To become knowledgeable about the prospects for change occurring in their lifetimes and in subsequent generations so that they may be able to adapt to new conditions and to demonstrate responsible, creative leadership in shaping a changing world.	4. Can explain the principles of the development and change of social institutions.	79-80, 85-86, 83-84, 81-82	33. To become knowledgeable about the prospects for change in the near and far-distant future
	9. Can explain the impact of technology on the institutional and his/her culture.	87-88, 91-92, 93-94, 89-90	30. To explain the principles of development and change of social institutions
	10. Can predict the consequences of the introduction of technology into a culture, including considerations of the scientific principles involved and of the environmental and cultural impacts of technique.	31-32, 33-34, 35-36, 37-38, 39-40, 41-42	

APPENDIX D

SAMPLE CURRICULUM VALIDATION WORKSHEET

CORE GOAL #1:

To develop skills in the use and interpretation of symbol systems which employ words, numbers, and visual/aural imagery; specifically,

a. to develop the ability to use and interpret language in written and spoken forms.
b. to develop the ability to use and interpret mathematical structures
c. to develop the ability to interpret other visual and auditory symbol systems.

RELATED COMP OBJECTIVES:	COMP Q #s
A Can receive information from oral presentations, media presentations, and unwritten cues.	1-2, 7-8, 13-14
B Can send information via speech, media, and nonverbal presentations.	103-104, 109-110, 115-116
C Can receive information from written materials	55-56, 63-64, 71-72
D Can send information using written materials.	79-80, 87-88, 95-96
E Can receive information using numeric and graphic representations.	19-20, 31-32, 43-44
F Can receive information from numeric and graphic representations.	21-22, 33-34, 45-46